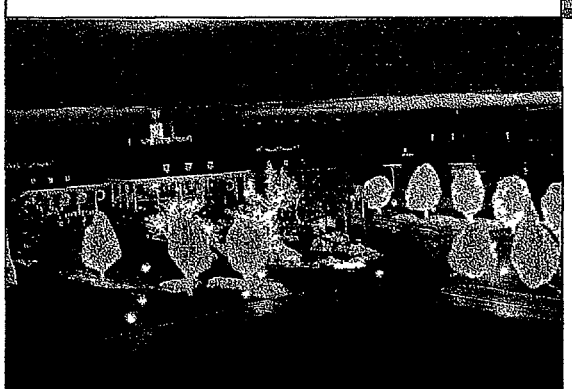
Executive Summary



Nashville ITS Strategic Plan

An Intelligent Transportation System for the Nashville Region

Kimley-Horn and Associates, Inc.

Executive Summary

In October of 1995, the Nashville Area Metropolitan Planning Organization (MPO), in cooperation with the Tennessee Department of Transportation (TDOT) and the Federal Highway Administration (FHWA) contracted with Kimley-Horn and Associates to prepare a Strategic Plan for Early Deployment of Intelligent Transportation Systems (ITS) in the Nashville area. The purpose of the plan is to create: (1) a plan for deploying advanced technologies to address user services emphasizing traveler and tourist information and traffic management; (2) a common architecture for the deployment of ITS technologies that conforms with national standards; and (3) a long-term coalition of public and private officials with an interest in ITS. The plan describes the results, findings, and recommendations for ITS in the Nashville area.

Intelligent Transportation Systems provide the tools necessary to address current surface transportation problems, as well as anticipate and address future demands through an intermodal, strategic approach to transportation. ITS applies current and emerging technologies in such fields as information processing, communications, control, and electronics capable of providing real-time traffic information to the traveler. Effectively integrated and deployed, ITS technologies offer many benefits, including more efficient use of our infrastructure and energy resources, and significant improvements in safety, mobility, accessibility, and productivity. ITS is a federally supported program and is eligible for Intermodal Surface Transportation Efficiency Act (ISTEA) funding. It is anticipated that ITS will also be included in the 1997 reauthorization of the national surface transportation act, which is currently being debated in the U.S. Congress.

As part of the plan process, a coalition of stakeholders involved in improving Nashville's transportation and communications systems were identified. The ITS Coalition included individuals from both public and private agencies, representing transportation services, academic institutions, major employers, and the tourist industry. Traveler information for the Nashville area, including tourist and visitors needs were inventoried and evaluated through a series of eight tasks. A brief description for each task and end product are shown in the table at the top of the following page.

With the assistance of the ITS Coalition, the following policy statements were adopted:

VISION	**MISSION**
• To develop an Advanced Traveler and Tourist Information System (ATIS) that will provide specific short-term and long-term improvements to the quantity and quality of information [on tourism, travel, and traffic] available to visitors and residents of the five-county region.	• To interact with transportation users in order to identify community needs and objectives, and apply the appropriate technology consistent with the national ITS program to solve the area's transportation and visitor information problems.

NASHVILLE AREA ITS STUDY TASKS

Task No.	Task Title	End Product
1a	Define transportation problems and systems	Database and bibliography
1b	Establish institutional framework.	A cadre of knowledgeable professionals & decision-makers
2	Establish user service objectives.	Broad statements of transportation system user needs.
3	Establish performance criteria	Factors by which to measure the results of any future ITS project.
4	Prepare a user service plan.	A logical sequence of how user needs can be met over time.
5	Identify needed functional areas.	Broad technology areas that can address user needs.
6	Define functional requirements to support user services; define system architecture.	More specific requirements and a logical communications network for linking those technologies together into a system.
7	Identify and screen alternative technologies.	Optional technologies within each functional area and an evaluation of those options.
8	Develop ITS strategic deployment plan.	Specific ITS projects using system architecture as guidelines; estimated costs and benefits.

Needs for transportation and information systems infrastructure were identified through:

- a focus group process with members of the Nashville ITS Coalition,
- review and analysis of previous reports and other documentation, and
- interviews with key public and private officials and citizens of the region.

With the needs identified, the next step focused on an evaluation of identified needs and the establishment of deployment time frames. The major emphasis of the needs evaluation was to determine the relation between the needs and nationally defined user services as well as ITS program plan goals. In addition, needs were evaluated against the goals and objectives of the MPO's Long Range Transportation Plan.

The User Need Categories and specific ITS User Services shown in the following table, consistent with the ***National ITS Architecture and National ITS Program Plan, are*** being recommended for implementation in Nashville.

USER SERVICES INCLUDED IN NASHVILLE'S ITS PLAN

Major User Need Categories	Specific ITS User Services for Nashville
Travel Demand Management	-Pre-trip Travel Information -Demand Management and Operations
Travel and Transportation Management	-En-route Driver Information -Route Guidance -Traveler Services Information -Traffic Control -Incident Management
Emergency Management	-Emergency Notification & Personal Security -Emergency Vehicle Management
Public Transportation Operations	-Public Transportation Management -En-route Transit Information -Personalized Public Transit -Public Transit Security
Commercial Vehicle Operations	-HAZMAT Incident Response -Commercial Fleet Management
Automated Accounting Systems	-Electronic Payment Services
Advanced Vehicle Control & Safety	-Intersection Collision Avoidance

Guidelines for ITS design were developed for the Nashville area, creating an evolutionary, open standards architecture that will incorporate specific technologies and market packages for each of the three deployment time frames. More than twenty separate ITS projects are envisioned to respond to the needs identified in the study. Implementation of these projects will bring the Nashville area to a level consistent with other major metropolitan regions in the country over the next fifteen to twenty years. The following ITS deployment schedules were established for the Nashville area:

■ Short Term	Phase I	1996 - 1999
■ Medium Term	Phase II	2000 - 2005
■ Long Term	Phases III & IV	beyond 2005

In developing a plan for the logical deployment of specific projects, four phases are recommended:

Phase I -Basic Advanced Traveler and Tourist Information System (ATIS) Elements (next two years)

- ■ Parking and Traffic Guidance System (being developed by the Department of Public Works)
- ◆ Franklin Traffic Safety and Intermodal Management Center (being developed by the City of Franklin)
- ◆ Variable Message Signs (VMS)
- ■ FM Traveler Advisory Radio (being developed by Nashville Convention and Visitors Bureau)
- ■ Enhanced Nashville Area Travel Web Page
- ■ Enhanced Visitor Kiosks at Tennessee Welcome Centers
- ▪ Special Event Control Software
- ◆ Incident Response/Removal/Clearance (recommended in Incident Management Plan)
- ■ GIS database standardization and completion
- ■ Commercial Vehicle Operational (CVO) Automated Vehicle Location (AVL) utilization

The short-term program also includes two Advanced Traffic Management System (ATMS) elements that were already under development before the current ITS Strategic Planning study was begun: the upgrading of the Downtown Nashville Signal System and a Traffic Management Center developed by the Traffic Engineering Department in Murfreesboro. These two systems are included in the plan.

Phase 2 -Expansion of ATIS (roughly 2000 - 2005)

- Development of a Regional Multimodal Traveler Information Center and Traffic Operations Center
- Basic Traffic Surveillance System
- Radio Broadcast Data System (RBDS), a subsystem of FM radio stations
- Interface for traveler information to other public broadcast media
- Interface to cellular and digital cellular services (DCS)
- Deployment of CVO electronic clearance on I-65 (currently under development on I-75
- Interface to private security monitoring service

Phases 3 and 4 — Long-Range ITS Deployment (beyond 2005)

- Field implementation of additional hardware (video, sensors, CCTV, etc.) in priority corridors
- Communications among Traffic Management Centers in the Nashville region
- Transition of field infrastructure to the system architecture
- Additional ITS technologies, including electronic fee collection, radio frequency (RF) tag readers for HAZMAT identification, RF tags on trucks and transit vehicles used as "probes" in the traffic stream

Implementation and operation of recommended ITS technologies are estimated at $8 million for Phase 1, approximately $10 million per year in Phase 2 and up to $25 million per year in Phases 3 and 4.

The strategic plan is based on a common architecture, yet allows individual entities (Metropolitan Government of Nashville and Davidson County, City of Murfreesboro, City of Franklin, the Nashville Convention and Visitors Bureau, the Tennessee Department of Tourism, etc.) the freedom to pursue an integrated set of smaller, incremental projects, to achieve the required ITS services and recommended system architecture.

As these projects are deployed, an overall Regional Management and Operations Plan for ITS is recommended to include the following components:

- Adoption of a common systems architecture.
- Field infrastructure installations at selected locations.
- Integration of separately-developed Traffic Management Centers (TMCs) in Nashville and outlying areas including Murfreesboro and Franklin.
- A single, Regional Multimodal Traveler Information Center and Traffic Operations Center (RMTIC/TOC) to provide data processing hardware and software for real-time traffic surveillance and ATIS interface.
- A strategic ITS communications plan for the State of Tennessee.
- Interoperability between TMCs in various local jurisdictions in the region and beyond.
- Establishment of an ITS management structure, including the continuation of an ITS Coalition, an ITS management team, and ITS deployment teams.

The success of this strategic plan will depend on the commitment of the state, the MPO, and other local decision-makers. By applying the appropriate technological solutions to address transportation and traveler information needs identified in this plan, significant efficiencies in transportation services can be realized.